Kit **6** comprises optical fiber **12**, capillary tube **14**, and stopper **16**.

Fiber **12** is an elongate substantially cylindrical optically transparent body adapted to propagate along its length by multiple total internal reflections, optical radiation entering an end of the fiber within an established solid angle substantially rotationally symmetric about the fiber's axis. As is well known in the art of fiber optics, the maximum acceptance angle, with regard to the fiber axis, B, for the radiation entering the fiber and so propagated within it, is established by the refractive indices of the fiber and the surrounding medium. For radiation initially propagating through a medium of refractive index no , incident upon a fiber of refractive index $n_1$otherwise surrounded by a material of refractive index n_2, the maximum acceptance angle may be found from the equation

$$N.A. = n_0 \sin B = (n_1^2 - n_2^2)^{\frac{1}{2}} \quad (1)$$

where N.A. is the so-called numerical aperture of the fiber. By way of example, but not limitation, fiber **12** may be any of a number of optically transparent materials, such as glass, quartz, polypropylene, polyolefin, nylon, or the like, chosen to have an index of refraction greater than that of the fluid sample being assayed. The latter typically is an aqueous solution having an index of refraction near 1.33 or a serum sample having an index of refraction near 1.35. The fiber is further chosen of a material that is relatively insoluble and non-reactive with the fluid sample. It has been found that 200 microns is a satisfactory fiber diameter, although other fiber diameters may be used, For most assays, a fiber 25 mm in length appears adequate; however, it will be understood that the length of the fiber can be accommodated to the assay to be undertaken. Sensitivity in fact improves with increase in fiber length until signal attenuation over the fiber length exceeds 1/e.

As will be described in detail hereinafter, fiber **12** is provided with a surface coating including means for attaching selected moieties of an antigen-antibody complex. As herein used, the term "antigen-antibody complex" includes complexes not only of complete antibodies and antigens, but complexes incorporating immunologically reactive fragments of either or both.

Capillary tube **14** is preferably an optically transparent tube, its material of construction also being chosen to be relatively insoluble and nonreactive with the fluid sample being assayed. Thus, capillary tube **14** is preferably fabricated from such materials as glass, quartz, polypropylene, polyolefin, or the like. In a preferred embodiment, capillary tube **14** is of right circular cylindrical bore, having an inside diameter a slightly larger than the diameter of fiber **12** (e.g., for a fiber diameter of 200 microns, capillary tube **14** may have an inside diameter of about 240 microns). However, as will be described, the invention may be practiced with capillary tubes of considerably greater internal diameter than the fiber.

Stopper **16** is configured and dimensioned to fit within an end of capillary tube **14** and support an end portion **18** of fiber **12** substantially coaxially and in spaced-apart relation within the capillary tube. Additionally, stopper **16** provides a hard locating surface for positioning kit **6** in a fluorimeter as will be described hereinafter. To these ends, stopper **16** is preferably provided with a flange **20** having an overall diameter on the order of the outside diameter of capillary tube **14** and a centrally disposed ferrule-like extension **21** coaxial with a central bore **22**. Bore **22** penetrates throughout stopper **16**, and is dimensioned to secure end portion **18** of fiber **12**. In a preferred embodiment, stopper **16** is molded in place about fiber **12**, the stopper being preferably fabricated of a low refractive index material, such as siloxane. Fiber **12** passes through and is supported by stopper **16** so as to expose substantially all of the fiber but end portion **18** to the interior of capillary tube **14**, leaving end face **24** of end portion **18** unobscured and coterminous with the extremity of bore **22** external to the capillary tube.

End face **24** is preferably planar and disposed normally to the axis of fiber **12**. Preferably, end face **24** is also highly transparent and free of blemishes which would tend to scatter light incident upon the end face. To this end, end face **24** may be optically polished, although it has been found that fused quartz fiber may be cleaved to provide an adequate optical surface.

Optionally, the end face **26** of the fiber distal from end face **24** is also polished flat or cleaved and further provided with a mirror coating **28** (or a separate mirror) disposed substantially normal to the fiber axis, thereby causing radiation trapped in the fiber to double-pass the fiber.

The overall dimensions of fiber **12**, capillary tube **14**, and stopper **16** preferably are chosen to insure that end face **26** of the fiber is within the capillary tube.

It will be realized that kit **10** as thus described is essentially the same as that taught in U.S. Pat. No. 4,447,546. Importantly however in the present invention, tube **14** is provided with port **30** in fluid communication with the interior of tube **14** distal the open end of the tube. In a preferred embodiment, port **30** is in the form of a tubular conduit **32** provided with a septum **34**. Tubular conduit **32** is located proximate stopper **16** and extending radially from tube **14**. Septum **34** is adapted, as well known in the art, to be penetrated by a hypodermic needle (not shown), and the interior of conduit **32** is dimensioned to accommodate the needle intended for use with the system. It will be understood that port **30** might equally well be the appropriate coupling for attachment to a Luer lock-equipped syringe, or some equivalent apparatus.

Prior to being assembled into kit **10**, fiber **12** is provided a coating, as will be described, activating a region **36** of the cylindrical surface of the fiber for the assay to be performed. In a preferred embodiment, the activated region **36** is restricted to a predetermined length of fiber **12** by a chemically and optically inert coating **38** of, for instance, low optical index silicone, extending over both ends of the fiber. It will be understood, however, that the dimensions of activated region **36** may be controlled by other means (e.g., by masking the fiber during coating), or, alternatively, the entire length of fiber **12** might be activated and the length of the fiber disposed within the capillary tube to be carefully controlled.

Turning now to FIG. **3**, there may be seen a highly stylized representation of a longitudinal crosssectional portion of kit 2 within activated region **36** of fiber **12**, filled with a sample **43** to be assayed. The surface of fiber **12** within region **34** is provided with a plurality of coupling sites **44**, to a number of which are bound a moiety **46** of the antibody-antigen complex. As used herein, the phrase "moiety of an antibody-antigen complex" refers to an immunologically reactive portion of such a complex, and includes haptens as well as complete antigens and antigen reactive antibody fragments [Fab] as well as complete antibodies. Coupling sites **44**